

US EPA ARCHIVE DOCUMENT



AEP Cardinal Power Plant
Brilliant, Jefferson County, Ohio
US EPA Inspection - August 2009
Fly Ash Dams and Bottom Ash Pond Complex
Action Plan based on Final Recommendations
December 2009

4.2 Maintaining and Controlling Vegetation Growth

Recommendation:

The grass cover on Fly Ash Dam No. 2 appeared to be reasonably maintained with only isolated areas of mild cover loss. This practice should continue. Vegetation did, however, become more evident in the rock lined abutment groins and downstream slope ditch line where mowing is not possible. In these areas, herbicide (in accordance with applicable laws/rules) is recommended to control weed growth. Woody plants may require hand removal.

A grass cover on the Bottom Ash Pond and Recirculation Pond dikes will likely be difficult to establish and maintain, due to the granular surface, operations traffic, and routine grading operations. An exception is the east dike facing the Ohio River where vegetation has been able to grow. In this area the plant growth should be cut and reseeded as required. The heavier brush and woody vegetation at the northern extent of the east dike should be cut down and appropriately seeded with grass.

CHA recommends that vegetation be cut prior to each quarterly inspection performed by AEP representatives so that adequate visual inspections can be made.

Response:

AEP fully understands that maintenance of the facilities is part of the actions required to ensure the integrity of the dam and dikes at the AEP facilities. Therefore, AEP will continue a proactive maintenance and monitoring program as established. Vegetation within rock lined channels will be controlled through the proper use of herbicides to retard growth. Existing vegetation within these channels will be cut prior to application. As part of our annual maintenance program, mowing is performed at least twice a year. Mowing will be coordinated such that the visual inspections can be performed without hindrance.

4.3 Bottom Ash Pond and Recirculation Pond – General Crest Areas and Slopes

Recommendation:

These areas typically had intermittent erosion rills, likely exacerbated when grading activities pushed loose material to the crest edge and sheet flow became concentrated during rain events. These erosion rills should be filled in with compacted material and otherwise stabilized. When grading activities push material to the crest edge, a concerted attempt should be made to compact these areas prior to the next rain event.

Response:

Existing erosion rills will be filled, graded and compacted by September 2010. AEP will continue to monitor this area as part of its Dam Inspection and Maintenance Program (DIMP). Quarterly inspections of the facility are performed by Plant personnel and AEP Engineering conducts an annual inspection. If erosion areas are noted during the inspections, repairs will be performed with compacted fill and stabilized.

4.4 Recirculation Pond Outlet Area

Recommendation:

Fairly large, deep erosion gullies were observed on the inside slope of the Recirculation Pond adjacent to the outlet approximately where the incised portion of the pond transitions to the east dike. At the time of the site visit, the pool elevation was such that the water was not going into the gullies. This will likely change as the pool elevation rises to its maximum pool. CHA recommends that these gullies be filled in and stabilized. This area should also be graded to direct run off away from this area.

Response:

AEP has completed additional maintenance work items since the date of this inspection. The work included the repair to the area noted in this recommendation. AEP will continue to monitor this area as part of its Dam Inspection and Maintenance Program (DIMP). Quarterly inspections of the facility are performed by Plant personnel and AEP Engineering conducts an annual inspection. If erosion areas are noted during the inspections, repairs will be performed with compacted fill and stabilized.

4.5 Bottom Ash Pond – Primary Spillway/Decanting Tower

Recommendation:

Vegetation had started to establish itself in the skimmer for this unit. Although it has not become a problem presently, removal is recommended to maintain this area before the vegetation fouls the tower outfall or prevents the skimmer from working effectively.

Response:

AEP has completed some additional maintenance work items since the date of this inspection. All maintenance work, including removal of cenospheres and vegetation within and around the decant tower skimmer, will be completed by September 2010. AEP will continue to monitor this area as part of its Dam Inspection and Maintenance Program (DIMP). Quarterly inspections of the facility are performed by Plant personnel and AEP Engineering conducts an annual inspection. If items requiring maintenance are noted during the inspections, repairs will be performed within a timely fashion relative to the scope of work.

4.6 Bottom Ash Pond and Recirculation Pond – East Dike**Recommendation:**

Normal pool of the Ohio River is at about elevation 644 as shown on the design drawings. These drawings also indicate a 100 year flood level at about elevation 664 suggesting that routine high water levels are likely to submerge the downstream toe. During the site visit, slope protection such as rip rap was not observed in this area. CHA recommends an analysis of the flood level water velocities in the area of the downstream slope to determine if rip rap or some similar slope protection is warranted. AEP has indicated that a similar analysis has been performed on another of their facilities along that portion of the Ohio River which suggests the water velocities against the earth structures during flood conditions do not achieve levels at which soil erosion is problematic. In light of this information and CHA field observations, it is not likely that slope protection is necessary, and a site specific analysis, though preferable, should not be considered a critical item at this time.

Response:

AEP acknowledges this comment and will continue its dam inspection and maintenance program (DIMP). This area will be inspected after highwater conditions to assess the condition of the slope protection.

4.7 Fly Ash Dam No. 2 – Erosion**Recommendation:**

An erosion rill and subsequent loss of grass cover was observed on the downstream slope between the upper bench and west groin. Thinning and loss of grass cover due to sheet flow was noted in other isolated areas on the downstream slope as well. CHA recommends filling the rill and reseeding the areas.

Response:

AEP has completed additional maintenance work items since the date of this inspection. The work included repairs to erosion features and poor vegetative cover. AEP will continue to monitor these areas as part of its Dam Inspection and Maintenance Program

(DIMP). Quarterly inspections of the facility are performed by Plant personnel and AEP Engineering conducts an annual inspection. If items requiring maintenance are noted during the inspections, repairs will be performed within a timely fashion relative to the scope of work

4.8 Fly Ash Dam No. 2 – Steel Weir Repair

Recommendation:

One of the steel V-notch weirs had become undermined so that water does not flow through the notch where it can be measured. CHA recommends replacing the weir or removing it.

Response:

AEP will evaluate the weirs used to measure seepage and complete all repairs as necessary by September 2010. AEP will continue to monitor this area as part of its Dam Inspection and Maintenance Program (DIMP).

4.9 Bottom Ash Pond and Recirculation Pond Hydraulic Analysis

Recommendation:

AEP was not able to provide CHA with a hydraulic analysis showing the Bottom Ash Complex's ability to safely pass the 50% PMF event. However, preliminary analyses performed by CHA suggest there is enough storage capacity at the current operating pool to safely withstand this rainfall event. We recommend AEP perform a complete study to confirm this, and update the study if operating levels of the pond change in the future.

Response:

An evaluation of the bottom ash pond complex during less severe flood events was completed several years ago. This study will be used as a basis to evaluate the regulatory design flood of 50% PMP, which is approximately 13 inches of precipitation. AEP concurs and expects that there is adequate storage capacity to handle the design flood. The analysis will be completed by December 31, 2010.

4.10 Additional Stability Analyses – Bottom Ash Pond and Recirculation Pond

Based on our review of available information for the Bottom Ash Complex we recommend that the following tasks be performed to confirm that the embankments are indeed stable under the various loading conditions outlined in Section 3.3:

Recommendation:

CHA recommends that a stability analysis model be developed for the maximum surcharge pool (flood) condition.

Response:

AEP will plan to revise the seepage and stability analyses for the bottom ash complex for the maximum surcharge pool condition. This analysis will be completed by December 31, 2010.

Recommendation:

CHA recommends modeling the upstream slope stability for seismic and steady state seepage load cases.

Response:

AEP will plan to revise the seepage and stability analyses of the upstream slopes for the bottom ash complex for steady state seepage and seismic condition. This analysis will be completed by December 31, 2010.

Recommendation:

CHA recommends that the rapid draw-down load case be evaluated for the bottom ash complex for reasons explained in section 3.3.

Response:

AEP will develop a rapid draw-down scenario for the dikes defining the recirculation pond and perform a stability analysis. A rapid draw-down condition of the bottom ash pond portion is not a likely scenario since the pool level is somewhat controlled by the level of the recirculating pond. This analysis will be completed by December 31, 2010.

Recommendation:

We recommend that a liquefaction analysis be performed in light of some of the loose to very loose alluvial soils encountered during the subsurface investigation for the site.

Response:

Overall, AEP believes that the alluvium soils at this site have a low potential for liquefaction, particularly under the seismic action of a credible earthquake for this region which is listed as very low seismicity. The subsurface conditions will be evaluated for potential liquefaction conditions. Several common screening techniques will be used to determine if materials have a potential for liquefaction. This evaluation will be completed by December 31, 2010.

4.11 Fly Ash Dam No. 2 Recommendations for Additional Stability Analyses

Based on our review of available information for Fly Ash Dam No. 2 we recommend that the following tasks be performed to confirm that the embankment with its present buttressed geometry installed during the 1998 construction repair is indeed stable under the various loading conditions outlined in Section 3.3:

Recommendation:

CHA recommends a maximum surcharge stability evaluation be performed for the steady state conditions on the upstream and downstream slopes.

Response:

AEP will plan to revise the seepage and stability analyses for the current configuration of the fly ash dam during the maximum surcharge pool condition. This analysis will be completed by December 31, 2010.

Recommendation:

CHA recommends modeling the upstream and downstream slope stability for seismic and steady state seepage load cases from the maximum storage pool elevation.

Response:

AEP will plan to revise the seepage and stability analyses of the current configuration of the fly ash dam for steady state seepage and seismic condition. This analysis will be completed by December 31, 2010.

Recommendation:

CHA recommends a rapid drawdown analysis be performed for the current conditions for reasons explained in Section 3.3.

Response:

AEP will develop a rapid draw-down scenario for the fly ash dam and perform a stability analysis. This analysis will be completed by December 31, 2010.